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# Defining the Homeland Security Domain: a Taxonomic Challenge

Gassie, Lillian Woon

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<http://hdl.handle.net/10945/59769>

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# Defining the Homeland Security Domain: a Taxonomic Challenge

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Dudley Knox Library  
Naval Postgraduate School





# Agenda

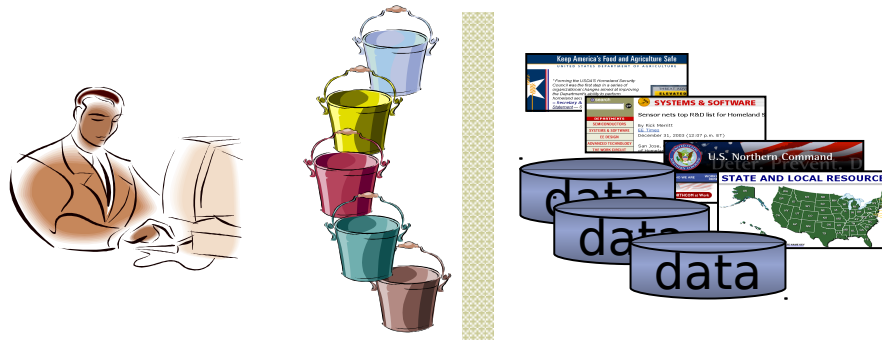
- Introduction
- Purpose of a Taxonomy
- Development Processes
- Challenges
- Taxonomy Design & Model
- Taxonomy Application
- Tasks: Current, Planned & Future
- Conclusion





# Purpose of a Taxonomy

- Acts as a communication layer between users and information resources
  - Facilitates user navigation
  - Categorizes information





# Purpose of a Taxonomy (2)

- Models specific subject domains
  - Defines scope of a domain
  - Communicates relationships between concepts



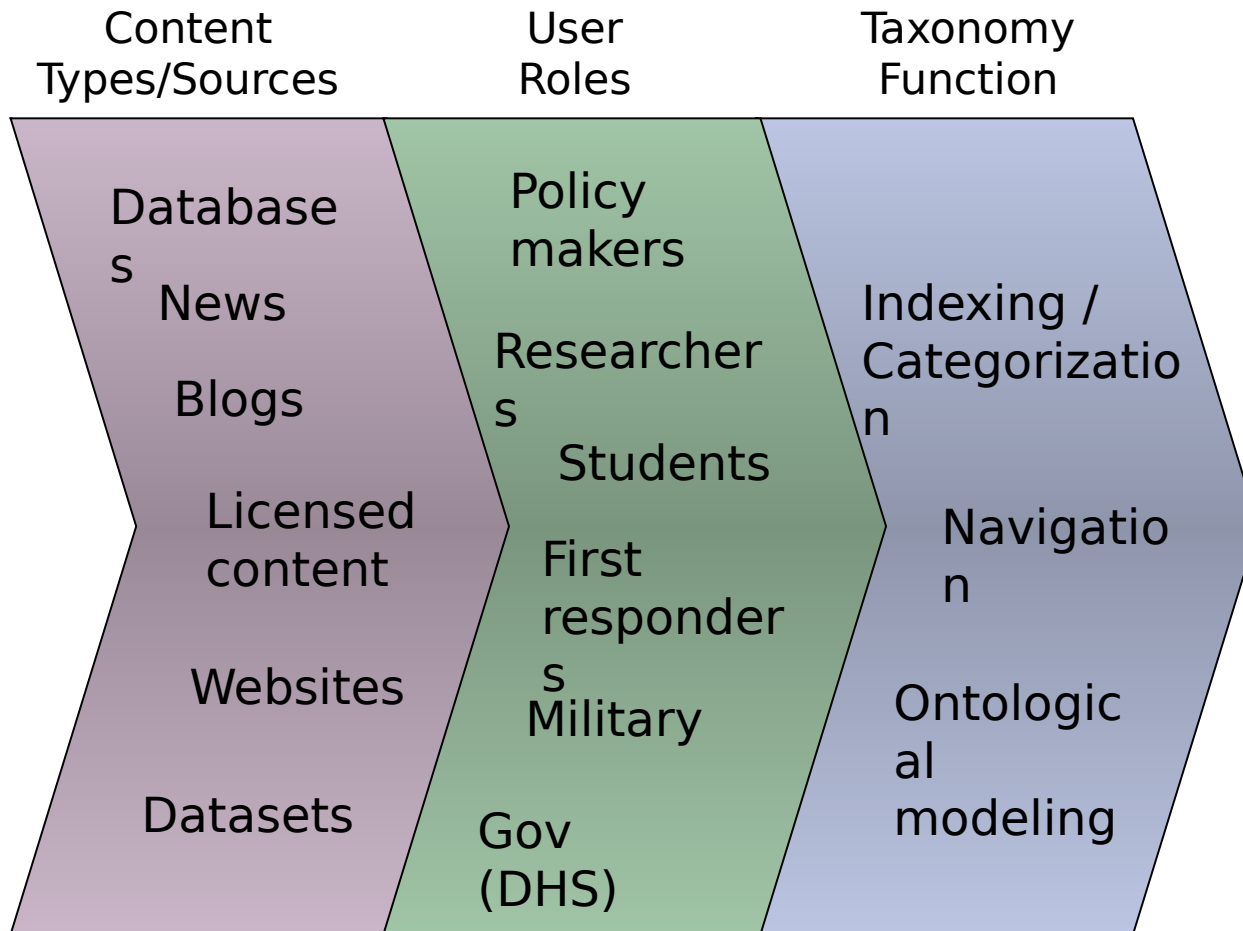


# Purpose of a Taxonomy (3)

- Provides structure and consistency
  - Saves time and effort in information seeking
  - Creates a bridge between disparate information resources



# Bringing Content to Users in Context



End User



Contextual Access

Relevant Labeling

Usability



# Purpose of the HS Taxonomy

- Required by the Homeland Security Digital Library to:
  - Define the scope
  - Index resources collected
  - Categorize search results
  - Enable users to navigate the HSDL portal





# Taxonomy Development Processes

	Phase 1	Phase 2	Phase 3	Future?
<b>Tasks</b>	<ul style="list-style-type: none"> <li>Define scope</li> <li>Interview stakeholders</li> <li>Literature review</li> <li>Term gathering</li> </ul>	<ul style="list-style-type: none"> <li>Conceptual def</li> <li>Navigational tax</li> <li>Indexing tax</li> <li>Test &amp; review</li> </ul>	<ul style="list-style-type: none"> <li>Refine taxonomies</li> <li>Integration</li> <li>Maintenance</li> <li>Usability</li> </ul>	<ul style="list-style-type: none"> <li>Ontology dev.</li> <li>Semantic services</li> </ul>
<b>Tools / Technology</b>	Concept extractors	Thesaurus software	Search & categorization tool	??
<b>Challenges</b>	<ul style="list-style-type: none"> <li>Access to SME</li> <li>Defining scope</li> <li>Growing skills</li> <li>Competing priorities</li> </ul>	<ul style="list-style-type: none"> <li>Conceptual to practical</li> <li>Mapping of terms</li> <li>Labelling</li> <li>Scope</li> </ul>	<ul style="list-style-type: none"> <li>Prioritizing criteria</li> <li>Funding</li> <li>Testing</li> </ul>	<ul style="list-style-type: none"> <li>Time</li> <li>Skill</li> <li>Funding</li> </ul>
<b>Output / Results</b>	<ul style="list-style-type: none"> <li>Requirements</li> <li>Scope</li> <li>Resources</li> <li>Plan</li> </ul>	<ul style="list-style-type: none"> <li>Taxonomic model</li> <li>Navigational tax</li> </ul>	<ul style="list-style-type: none"> <li>Integration</li> <li>Knowledge discovery</li> </ul>	<ul style="list-style-type: none"> <li>Intelligent agents</li> </ul>



# Challenges: the Domain

- Ontologically complex



# Challenges: Modeling

- Traditional, single hierarchical structure inadequate

## Security

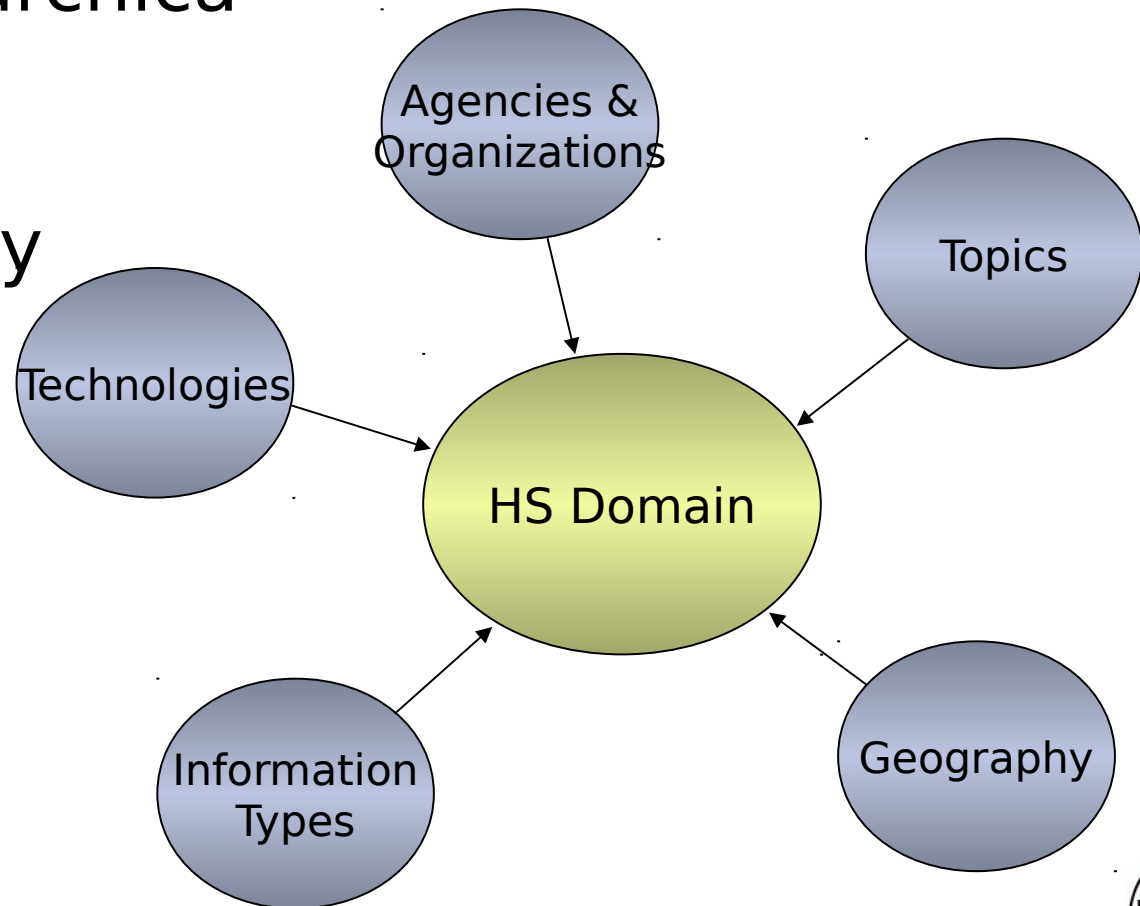
- Border security
  - Border patrols
  - Bridge administration
  - Entry and exit data system
  - Ports of entry
- Communications security
- Cybersecurity
  - Computer systems disruption
    - Computer viruses
    - Computer worms
  - Computer systems intrusion
    - Active network intrusion defense
  - Data encryption
    - NIST Advanced Encryption Standard
  - Database security
- Detection
  - Acoustic detection
  - Aircraft detection
  - Antidetection measures
    - Acoustic signature control





# Challenges: Modeling (2)

- Polyhierarchical access
- Faceted taxonomy





# Faceted Model

Topics	Agencies & Organizations	Resource Types	Geographic	Technologies
Borders & Im.. Border Sec.. Immigration Emergency .. Equipment ..  Preparedness Response Medical .. Infrastructure .. Agriculture .. Banking ..	Academic Federal Executive  Independent Judicial Legislative International Non-Gov Local State Terrorist	Case Study Exercise Hearing Key Doc Policy Req Reading Simulation Strategy Tool	United States  Northeast Delaware Maryland New York ...	Identification Biometrics DNA Forensic ... Sensors Biosensors Nanosensors Proximity ..





# Faceted Model (2)

- Each facet is mutually exclusive
- Facet is a taxonomy by itself
- Reflects a **significant** aspect of the domain
- Extensible
- Increase number of concepts with post-coordination
- Potential for interoperability; XFML





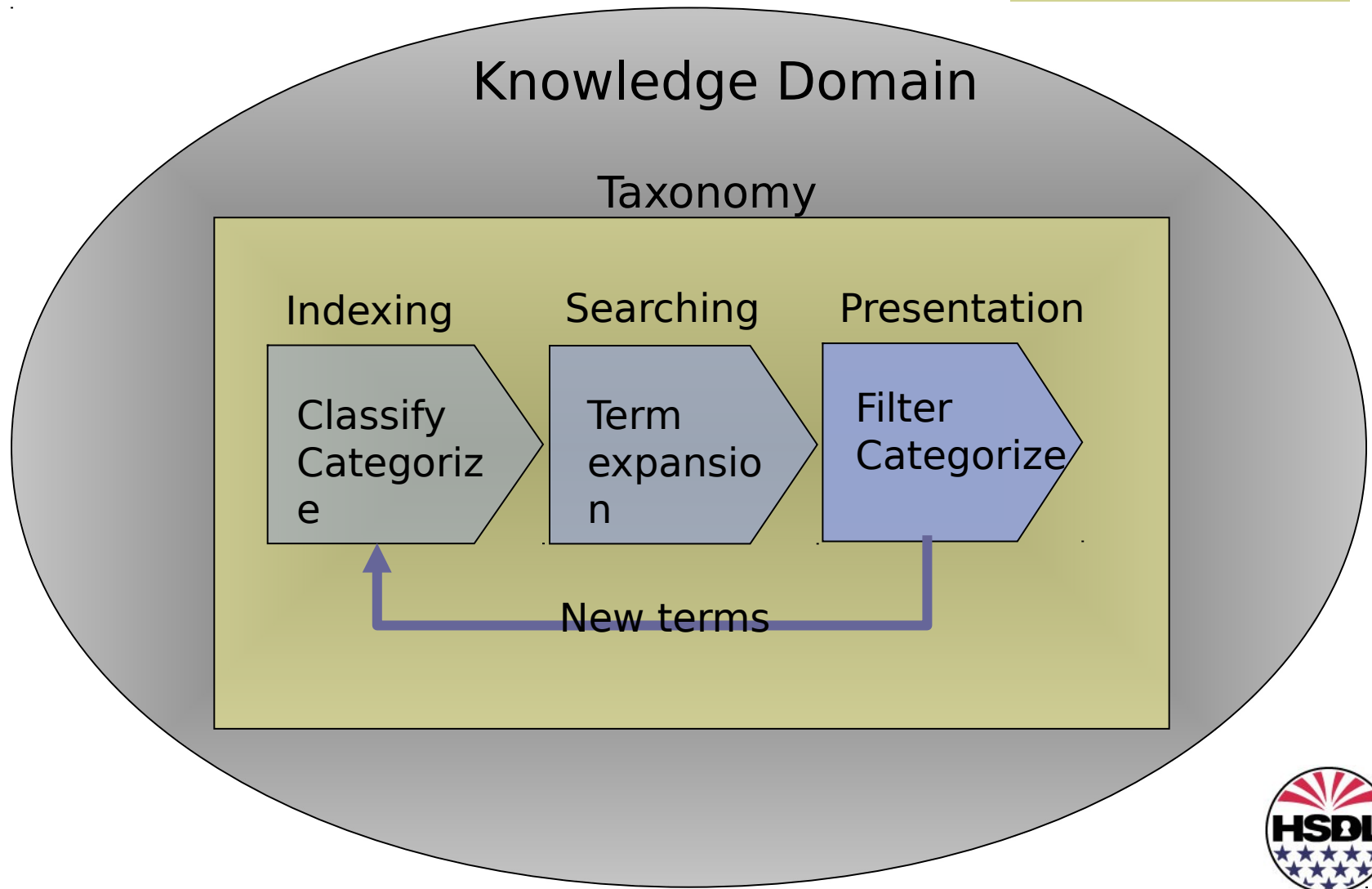
# Facet Design Challenges

- No overlapping of concepts
- Logical relationship between facets
- Translating into a navigation structure
- Labeling & usability





# Taxonomy Application





# Taxonomy in action


uPortal 2.1.4 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Reload Home Search Favorites Media Mail Print Copy Paste abc Address Links

ABOUT | CONTACT | DUDLEY KNOX LIBRARY | HSLD.ORG LOG OUT | FEEDBACK | SITE MAP | PREFERENCES | SEARCH THIS WEBSITE

GO

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Home | MyLinks | Search | Browse Topics | Help | Browse Courses | Ask Librarian

★ Browse Topics

Top

<b><u>Agencies &amp; Organizations</u></b> <a href="#">Non-Government Organizations</a> , <a href="#">Terrorist Organizations</a> ...	<b><u>Border Security</u></b> <a href="#">Land Borders</a> , <a href="#">Maritime &amp; Port Security</a> ...	<b>★ Suggest a link</b> <a href="#">Suggest a link</a>
<b><u>Civil Military Relations</u></b> <a href="#">Role of Armed Forces</a> , <a href="#">National Guard</a> ...	<b><u>Emergency Preparedness &amp; Response</u></b> <a href="#">Medical Support &amp; Services</a> , <a href="#">Risk Communication</a> ...	
<b><u>Infrastructure</u></b> <a href="#">Water</a> , <a href="#">Telecommunications</a> ...	<b><u>Intelligence</u></b> <a href="#">Intelligence Policy</a> , <a href="#">Intelligence Community</a> ...	
<b><u>Management &amp; Organization</u></b> <a href="#">Strategic Planning</a> , <a href="#">Threat Analysis</a> ...	<b><u>Politics &amp; Government</u></b> <a href="#">Socio-cultural Policy</a> , <a href="#">Religion</a> ...	
<b><u>Public Health</u></b> <a href="#">Research</a> , <a href="#">Public Health Policy</a> ...	<b><u>Technology</u></b> <a href="#">Surveillance Technology</a> , <a href="#">Simulation &amp; Modeling</a> ...	
<b><u>Terrorism &amp; Threats</u></b> <a href="#">Nuclear &amp; Radiological Terrorism</a> , <a href="#">Psychology</a> ...	<b><u>Transportation</u></b> <a href="#">Sea</a> , <a href="#">Mass Transit</a> ...	
<b><u>Weapons &amp; Weapon Systems</u></b> <a href="#">Weapons of Mass Destruction</a> , <a href="#">Non-Lethal Weapons</a> ...		

Internet

# Taxonomy in action

My HSDL - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Mail Print Fax abc Address Links

HOME | ABOUT | CONTACT

LOGOUT | SITE MAP | FAQ | SEARCH  GO

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MyHSDL | Home | Search | Browse Library | Help Desk | Browse Courses | Ask Librarian

Related Categories	Organizations	Technologies
<ul style="list-style-type: none"><li>Psychology</li><li>Cyberterrorism</li><li>Chemical Terrorism</li></ul>	<ul style="list-style-type: none"><li>Al-Qaida</li><li>Hamas</li><li>Real IRA</li><li>National Liberation Army</li><li>Armed Islamic Group</li><li>Abu Sayyaf Group</li></ul>	<ul style="list-style-type: none"><li>Computer Networks</li><li>Data Management</li><li>Information Security</li><li>Sensor Technology</li><li>Simulation and Modeling</li><li>Surveillance Technology</li></ul>

Search results for term "terrorism". Displaying results 10 of 230.

Search Website | Search Database | Search BOSUN 1 | 2 | 3 | Next >>

Save Search Email Results

**Weapons of Mass Destruction and Terrorism: Mental Health Consequences and Implications for Planning and Training**  
The author attaches emphasizes to effectively understanding, preventing, and responding to Weapons of Mass Destruction and Terrorist events, and further stating that we must understand the centrality of their psychological impact. A list of characte  
Published: 02-05-2004 | Author: N/A  
Size: | Format: html

**Second Annual Report to the President and the Congress of the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction: II. Toward a National Strategy for Combating Terrorism**  
In its second year, the Advisory Panel shifted its emphasis from threat assessment to broad program assessment. The Advisory Panel addressed specific programs for combating terrorism and larger questions of national strategy and Federal organization  
Published: 02-04-2004 | Author: N/A  
Size: | Format: pdf

**Gilmore Commission: Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction**  
Also known as the Gilmore Commission, the Advisory Panel assesses the capabilities for responding to terrorist incidents in the U.S. homeland involving weapons of mass destruction. Response capabilities at the Federal, State, and local levels are ex

My Computer



# HS Taxonomy: Current Status

- Navigation and indexing taxonomies almost synchronized
- Navigational taxonomy finalized
- Faceted taxonomies, in progress
  - Term consolidation
  - Gap identification





# Planned Tasks

- Usability & user acceptance
  - Focus groups
  - Usability testing
  - Review of search logs
- Integration into portal services
  - Search & categorization tool
  - Federated search tool





# Future Tasks

- Concept extraction
- Mapping to other taxonomies
- Ontology development





# Conclusion: Lessons Learned

- Taxonomy development
  - Can be complicated
  - Requires a lot of resources
  - Requires understanding of domain
  - Must be user focused
  - Is absolutely necessary!





# Notes

Contact info:

[lgassie@nps.navy.mil](mailto:lgassie@nps.navy.mil)

List of taxonomy resources:

<http://library.nps.navy.mil/home/staff/lgassie/taxonomy.htm>

Acknowledgement:

Next Brick Solutions

<http://www.nextbrick.com>

